HEADACHES IN RELATION TO OCULAR CONDITIONS *

BY

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Headache, one of the commonest of symptoms, is one whose pathology is very doubtful and difficult to explain. The variety of its causes is almost innumerable, and, though many forms of it may be expressed as reflex neuralgias, in terms of the fifth nerve or other nerves supplying the scalp or cranium, yet it is difficult to be certain of the mechanism of headache in a great number of cases.

Pressure Headaches

It has been usual in the past to ascribe headache due to rise of intracranial pressures and migraine as the result of influences such as pressure acting upon the recurrent meningeal branches of the trigeminal nerve, which supply the dura in the various fossae and the falx. Yet we are met by the fact that quite large areas of the dura appear to be insensitive to surgical manipulation in decompressions done under a local anaesthetic. Surgeons tell me that the areas of dura which are specially sensitive are those in the neighbourhood of the larger vessels and of the chief sulci. Opinions vary as to whether the sympathetic supply of pia-arachnoid vessels has any bearing on the conduction of sensations. On the whole, modern physiological opinion is against the sympathetic system being a carrier of sensory impressions, but some authors assert definitely that pain may be conducted along the sympathetic.

There seems no doubt that a sudden rise of intracranial pressure may be a cause of violent headache. This may be due to sudden out-pouring of blood from a subarachnoid haemorrhage at the base of the brain, and I have known this condition commence with sudden, violent pain at the back of the head. This is understandable, owing to interference with, and pressure upon, the meningeal trigeminal branches of the dura in the neighbourhood. In some of these cases subhyaloid haemorrhages may be seen as evidence of the spread of blood along the base to the back of the eye. Violent headache may, however, be produced by distension of the ventricles, and it is a symptom that comes on extremely rapidly from blockage of the foramen of Monro in cases of ependymal tumour in the ventricle. In this case the cerebro-spinal fluid escape through the foramen is obstructed and the pressure within the ventricle rapidly rises as the fluid is secreted from the choroid plexus.

General distension would cause pressure to be transmitted through the cerebral substance, and compress the cortex and the membranes against the vault of the skull, and also at the base, but it is a question whether the severe headache that is felt as a symptom is due to pressure upon the meningeal nerves on the surface or whether it is produced by the effects of the pressure on certain parts of the brain itself—for example, the thalamus, which is in such close relationship with the lateral ventricle.

Migraine

A common cerebral cause of headache, which has close associations with ocular conditions, is migraine. Here, in a typical case, the first onset of the scintillating scotoma, or hemianopia, will be succeeded some twenty minutes or half an hour later by violent unilateral headache, which may persist for hours, and be succeeded by vomiting.

What is the mechanism of the headache in this condition? There seems little doubt that in the preliminary stage of the aura there is arterial constriction, and actual narrowing of the central artery of the retina has been observed in this stage, succeeded later by throbbing and dilatation of the vessel. This fact suggests that a similar condition of constriction of the cortical vessels, especially in the occipital region, may be concerned in the production of the hemianopia, or other varieties of the scotoma scintillans, and that the subsequent headache is due to engorgement of the vessels and cerebral compression therefrom, the vomiting itself being suggestive of raised intracranial pressure. True migraine rarely has any direct connexion with ocular conditions, such as errors of refraction, though I have known a case in which repeated attacks of apparently typical migraine occurred for about eighteen months following a corneal ulceration and the subsequent astigmatism from scarring.

True migraine so often commences in early life—and, indeed, may be traced back to the periodic vomiting attacks that occur in infancy—and these headaches in children will very likely lead to consultation with an oculist, with the frequent discovery of small errors of refraction and the prescription of glasses therefor, in the hope of curing the headaches, but the true migraine headaches differ entirely from the headaches that are commonly produced by errors of refraction. Migraine is a periodic headache, coming on at irregular intervals, which lasts usually for twelve hours or longer, sometimes for a couple of days, and is generally associated with nausea and vomiting. A typical case will be preceded by the aura of scintillating scotoma, or hemianopia, or perhaps tingling along the lips and tongue, and even a temporary aphasia and weakness of an arm, rarely the leg. These are obviously cerebral effects, and should not be confounded with the different forms of refractive headache. Often there is a family history of the same condition, and other neuroses may be present in the family.

Headaches from Refraction Errors

These are probably dealt with more fully by the ophthalmic surgeons, but they appear to be not diagnostic from their location at any particular part of the head. The pain may be over the eyebrows, frontal region, or back of the head and neck. It may be one-sided, or it may be diffuse. It is not always the more severe forms of high hypermetropia or severe astigmatism that cause the most troublesome headaches, which are sometimes due to comparatively slight errors of astigmatism. The pain is not always produced only by using the eyes, but may be present on waking in the morning, and troublesome headaches which are not periodic and paroxysmal, as in migraine, should always be treated by corrective glasses, if definite errors of refraction are found and no other obvious cause is apparent. More particularly is headache likely to be produced when these errors are different in the two eyes.

Further Ocular Causes

Another cause, which no doubt will be fully gone into by the ophthalmic surgeons, will be headache referable to want of muscular balance, heterophoria, esophoria, and the like. Yet another cause that I have seen referred to recently is the difference in apparent size of the images perceived by the two eyes, so that there is a difficulty in acquiring true stereoscopic vision. Again, diplopia from actual muscle or nerve paresis may be a source of neuralgic headaches, but this cause would be very obvious in the patient's complaint, and treatment need not detain us here.

Conditions within the eyeball itself are common causes of headache—namely, iritis, cyclitis, and glaucoma. In

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iritis the pain appears first in the eyeball—a ciliary pain—and next spreads to the brow and temple along the supraorbital nerve; it may be very severe, throbbing and stabbing, and increasing at night. Sometimes the pain may be referred along the side of the nose, the infraorbital area, even into the cheek.

The pain in acute glaucoma may be very distressing, though its cause is not likely to be overlooked, but in chronic glaucoma neuralgic pains about the face and head are commoner perhaps than is generally believed. For example, in Parsons's textbook, *Diseases of the Eye* (seventh edition, 1934), in his description of chronic glaucoma, no reference is made to pain, and I have heard an ophthalmic surgeon assert that pain is never a symptom of chronic glaucoma. On the other hand, De Schweinitz writes, in his textbook (tenth edition, 1934, p. 417), after describing the pain of acute glaucoma:

"In chronic cases there may be only a general feeling of discomfort, a sense of fullness, occasional shoots of neuralgia, or attacks described by the patient as headache, or pain is entirely absent."

I have seen at least two patients in which violent neuralgic pains in the face, cheek and jaws, and temple appeared to be due mainly, or aggravated by, the presence of chronic glaucoma.

In choroidal tumour, if the tension is raised, a brow pain and neuralgia may be the symptom. The pain of corneal ulcers may be considerable, but is referred mainly to the eye itself, though the general distress and photophobia may lead in some subjects to general headache. Orbital abscess or tumours in this region naturally will be the source of pains referred to the brow and cheek, and if there is marked proptosis, and if the growth invades the eyeball, pain may be referred to the eye itself. Similarly, in exophthalmic goitre, when the proptosis is extreme, ulceration of the cornea may occur, associated with pain and headache. Frontal or ophthalmic herpes may be complicated by certain ocular conditions, such as corneal ulceration, iritis, perforation of the cornea, and panophthalmitis. The violent pains of ophthalmic herpes are, of course, well known, but occasionally—especially in old people—the persistence of the neuralgia is extremely distressing, and this may go on for years, and may apparently be permanent.

Headaches from Cerebral Disease and Neuralgia

The headaches of cerebral tumour, abscess, or meningitis need not detain us here, though papilloedema is a common physical sign in tumour or abscess. In meningitis the disks may remain normal throughout, though slight blurring of the edges is not uncommon. In sinus thrombosis headache may be very severe, and retinal haemorrhages may be most extensive.

The headache of cerebral arteriosclerosis is an important one to be recognized. After middle life it will usually be associated with increased blood pressure, and the pain is more or less continual for days or weeks, though it may clear up at times. These cases will be recognized first by the ophthalmic surgeon by the ophthalmoscopic appearances, by slight haemorrhages around the disk, and the well-known silver wire arteries, with their compression of the veins where the latter are crossed by arterial branches, and in more pronounced cases by the more definite appearances of albuminuric retinitis. The headache is often of a bursting character, and may be worse at night. There may be other symptoms of uraemia, such as vomiting and asthmatic attacks.

Neuralgic headaches that physicians meet with commonly, and which have often been treated extensively by throat and nose surgeons, and by prescribing of spectacles, are the various forms of migrainous neuralgia,

maxillary neurosis, and supraorbital neuralgia, together with the headaches which may be due to frontal and antral sinusitis. These latter are very common after catarrhal infections, or infections from the teeth, and should not be difficult to recognize by transillumination and x-ray, though they have no special connexions with the eye.

A common form of pain in the face, usually referred to the cheek, side of nose, and temple, is almost peculiar to women, and I have termed it "maxillary neurosis," or chronic neuralgia of the jaw. In many cases the pain has started after severe dental extraction, and, being unilateral, is thought to be a true neuralgia due to some piece of decayed stump or diseased bone. These cases usually run the gauntlet of nose and throat surgeons, dentists, and ophthalmic surgeons, before being seen by a neurologist. Patients often complain of a certain amount of swelling and flushing over the cheek, and though all the remaining teeth may be removed, the antrum washed out, turbinal bones removed, and glasses prescribed, the pain continues unabated. The pain is not paroxysmal or tic-like in character, but is more or less persistent, though it varies at different times of the day. No operative treatment is of any value, and alcohol injection should always be refused to these patients.

REFLEX ASTHMA: ITS PATHOLOGY AND TREATMENT

INCLUDING A REVIEW OF 337 CASES*

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Bronchospasm may be produced reflexly in many different ways, but the nose is the most important source of reflex asthma. A distended stomach and a distended rectum may both produce reflex attacks of asthma quite independently of any form of alimentary toxæmia. As Hurst¹ points out, the evacuation of the stomach or of the rectum produces immediate relief long before a change could take place in the blood from diminished absorption of poisons. In certain cases the cause of irritation appears to be central and psychical, but in such cases the action is not a reflex one. The purely nervous or psychical factor will therefore not be considered in this paper.

Mechanism

Some observers hold that reflex stimulation may arise in the lung itself. A focal lesion in the lung, such as an old healed and calcified tuberculous focus, may irritate the afferent fibres of the vagus nerve and so cause reflex asthma. The reflex action from the nose occurs through the naso-pulmonary reflex. This reflex has a reflex arc composed of the trigeminal nerve and the vagus nerve. The afferent, or sensory, branch of this arc consists of the ophthalmic and superior maxillary divisions of the fifth nerve, and of the sensory root and the sensory end nucleus of the trigeminus. The efferent, or motor, branch is formed by the dorsal motor nucleus of the vagus, the nucleus ambiguus, and the efferent fibres of the vagus nerve (see Figure). Certain parts of the nose are more closely connected with the naso-pulmonary reflex than others, and the area of the nose which, if stimulated, is more likely to cause bronchospasm has been called the asthmagenic area, the trigger area, or the ethmoid region. This area begins with the lower margin of the middle turbinal, and includes all of the upper air passages extending from this margin to the cribriform plate, both the lateral and septal surfaces of the nose being included. It is bounded in

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